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Foreign Investment, Supermarkets, and the Restructuring of Supply Chains: Evidence from Eastern European Dairy Sectors

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Abstract

The combination of transition and globalization since the early 1990s has caused dramatic changes in supply chains globally. This paper uses survey evidence from several Eastern European countries (Albania, Bulgaria, Poland, Slovakia, Romania and Russia) on how these forces affect the dairy sector. In many countries dairy farms are small family farms. Investments by foreign companies in processing and retailing and the opening to international markets have introduced higher standards, leading, in turn, to extensive contracting and vertical coordination in the dairy chain. In countries close to the EU the restructuring of the dairy chain was mostly driven by investments in dairy processing, while in countries further from the EU, and less advanced in transition, retail investments are playing a more important role in driving change throughout the dairy chain. There have been significant efficiency gains, and the vertical coordination had positive effects on farm investments and productivity, especially since the late 1990s. Evidence suggests that small dairy farms have generally benefited from the vertical coordination processes.

1. INTRODUCTION

In 2004, five Eastern European countries were among the top ten destinations of foreign direct investment (FDI) by global retail chains: Russia, Slovenia, Croatia, Latvia, and Slovakia. Russia, for the second year in a row, received most FDI in retailing worldwide. Moreover, Hungary, Poland and the Czech Republic are not on the list because they are already "mature markets", following massive investments a few years earlier. Only a decade ago, all of these economies were just emerging from state control of food markets. Moreover, the retail investments are just the latest foreign investment wave.

The combined forces of "globalization" and "transition" have, in all these countries, caused dramatic changes in the agri-food supply chains in the past 15 years. After vertically integrated supply chains collapsed in the early transition years with privatization and company restructuring, recently vertical coordination has increased again, due to a combination of factors, such as rising standards and major market imperfections (Gow and Swinnen, 1998; 2001). These changes had important effects on efficiency and equity (Swinnen, 2005). Important equity issues are whether this process is excluding small farms or whether contracting with downstream companies leads to rent extraction of farmers by creating dependency.

In this paper we draw on recent surveys in the dairy sectors of several countries to document the changes that have taken place and to identify the effects and the determinants of small farmer participation in restructured dairy supply chains. The surveys were conducted in Poland, Slovakia, Bulgaria, Poland and Albania, countries with very different levels of income, progress in transition reforms, and structure of dairy production (see table 3).

2. METHODOLOGY

In the following sections we will present data that were collected in several countries using a unique multi-stage survey methodology. In the first stage, interviews are conducted

with firms downstream in the dairy supply chain (e.g. dairy processors and retailers). In all countries we selected dairy processors to provide a mix based on size and ownership (domestically or foreign owned; private or cooperative). In Poland we interviewed 6 dairy companies, in Bulgaria - 11, Russia - 5, Slovakia - 6, and in Albania 12. In Poland and Russia, the interviews with dairy companies were complemented with interviews with retailers. In the second stage, information collected in the first stage is used to design a farm survey.

This survey design is country-specific. The structure of the farm sector is very different in Poland (small-scale household farming) and Slovakia (large-scale farm companies) and this has implications for the selection of respondents in the survey. The second stage was conducted in Poland in 2001, in Bulgaria in 2003 and Albania in 2005. On average 300 farm households were randomly selected in each of these countries. The data from the farm survey allow to econometrically estimate the effect of investments and assistance programs of processors on small suppliers.

Sometimes more stages were necessary. For example, in Bulgaria we found that dairy processors were not contracting with farm households directly but rather with milk owners of collection stations. This meant that information needed to be gathered also on the level of the milk collection stations in order to answer the research question.

3. A BRIEF OVERVIEW OF DAIRY IN EASTERN EUROPE

Dairy is important sector in all countries. However, milk production declined strongly in the first years of transition (figure 1). The main reason was that their milk production was heavily subsidized under the communist regime. The cut in subsidies and the disruptions associated with the economic reforms caused a collapse in output and in the number of dairy

cows.[1] Table 1 shows that in almost all Eastern European countries dairy cows declined with more than 40% and cow milk output went down by around 25%, except in Romania, Slovenia and Albania. Yields generally declined in the 1990s, but started increasing later and have grown robustly in most of the countries in recent years (see table 1 and figure 2).

Eastern Europe has an interesting mix of dairy farms. In many countries, the dairy sector is mainly small-scale household production. In Poland, Bulgaria, Romania, Albania and Moldova more than 85% (and in most more than 95%) of all milk producers have less than 5 cows. A high share of their production is used for self-consumption and the remainder is often sold to dairies through village collection points. This structure is changing only gradually. For example, between 1995 and 2000, farms with more than 5 cows increased by only 1.5% (from 0.9% to 2.4%) in Albania and by only 2.6% in Poland. Figure 3 illustrates the gradual change in farm structure on the basis of the Polish household survey.

The dairy farm structure is completely different in Slovakia. The vast majority of milk comes from large-scale corporate farms. In 1999 only 10% of family farms had dairy cows and more than half produced milk for self-consumption. On the other hand, 81% of the large corporate farms have dairy cows and 100% of this milk production is sold.

Also at the processing level transition caused large changes. Before transition, dairy processing was a state monopoly, but with processing facilities located in each major city. With privatization, restructuring, investments and increasing quality, consolidation is taking place. For example, in 1999 there were 570 dairy processors in Bulgaria. Their number strongly declined in the following years (to 404 in 2001 and 341 in 2004) due to the bankruptcy of small-scale processors that did not survive the competition on the market. There is a severe competition for milk supplies. The volumes supplied are much below the processors' capacities. Because of this, processors have to collect milk even from small farms located sometimes more

[1] Albania is an exception to this pattern, as the dramatic de-collectivization process there induced rapid growth in livestock output (see Cungu and Swinnen, 1999).

than 150 km away. In 2004, about 20% of the processors had export licenses. They account for more than 62% of the collected and processed milk in the country (table 2).

A similar evolution was observed in Poland. The total number of dairy processing companies with more than 50 employees went down by 22% between 1993 and 1999. As in Bulgaria, the strongest decrease was in the cooperative processors, while the number of (non-cooperatively owned) private companies doubled. Yet, cooperatives still controlled 70% of the dairy market in 1999.

In Albania there is a very different evolution. The number of processors increased from 330 in 2000 to 379 in 2004 (Albanian Ministry of Agriculture and Food, 2004). However, a large part are traditional and half-mechanized small processing units (baxho) on the one hand and dairy plants with a processing capacity of 10-70 tons/day on the other, with no co-operative processors among them.

Foreign direct investment (FDI) has played a crucial role in the restructuring process in Eastern Europe. FDI in the dairy sector has resulted from several company strategies: to serve the local market when trade constraints limit imports, to use the domestic economy advantages for exporting to the home market of the foreign company or to third markets, etc. The EU accession process further stimulated FDI because it reinforced the institutional and economic stability, the prospect of a large single market, growth in incomes and food demand, and - in some cases - expectations of EU subsidies (Walkenhorst, 2001; Dries and Swinnen, 2004).

Poland has attracted significant FDI in the dairy sector in the mid 1990s, yet at the same time local companies continue to have a large share of the market. The liberalization of the Polish trade system and the privatization of the processing industry in the 1990s opened the Polish dairy sector to increased competition from abroad, allowed Polish exporters to search for new markets, and allowed foreign companies to invest in the Polish dairy sector, with major effects (Dries and Swinnen, 2004).

In Slovakia, most foreign investments have taken place since 2000. This is late compared to Poland, where a major inflow of foreign investors in the sector occurred already in the mid 1990s (table 3). This is due to the political environment in the mid 1990s. Slovakia was the only of the 10 CEE applicants for EU membership that failed to meet the political criteria for EU entry. After a regime change in 1999 created a more stable investment climate, FDI poured in. By 2003 77% of milk purchased in Slovakia was processed by foreign owned dairy companies (Agra Europe, April 2003). Many of them are multinational companies: Sole, Italy; Meggle, Germany; Bongrain, Danone and Fromageries Bel, France; Artax, Austria; Friesland Coberco, Netherlands; and Amine Aour, Lebanon (table 4).

Also in Bulgaria and Albania FDI arrived relatively recent. Bulgarian had a severe economic crisis in the mid 1990s, constraining FDI inflow. In Albania, where FDI is still burdened with high transaction costs and administrative barriers, our survey found that in 2004 Greek and Italian investors have entered the market aiming at the creation of new, middle- or large-scale processing facilities, following the intensive FDI inflow from 2002 (table 3).

Russia is a mixed case. Foreign investments in the Russian dairy sector started in the mid 1990s by Western European dairy producers (Hochland (1994), Danone (1995), but really picked up after 1998 (Ehrmann (1999), Campina (2000) and Onken (2003), Lactalis (2002) and Lacto (1998). In recent years, a strong competition in the dairy sector exists among the main foreign owned dairy processors operating there and the large domestic processors like Wimm Bill Dann. This is especially true for the regions of Moscow and St-Petersburg with considerable investments in the dairy sector.

4. THE DISRUPTION AND REORGANIZATION OF DAIRY SUPPLY CHAINS

The simultaneous privatization and restructuring of farms, input suppliers, processors and retail companies caused major disruptions in the exchange relationships in the dairy chain

during transition. Widespread forms of contracting problems during transition were long payment delays or non-payments for delivered products. Such payment delays caused major drains on much needed cash flow for suppliers. An illustration is from the following quote: *"Romanian farmers are holding back supplies of milk as they are experiencing considerable delays in being paid by processors and other buyers. Many farmers have to wait more than two months to be paid for their milk. Some started bringing milk into towns themselves as they will get their money immediate"* (AgraFood East Europe, March 2003, p.23). This was a major problem for farms (Gow and Swinnen, 1998; Gorton *et al.*, 2000). In addition, farms did not get access to credit and key inputs. Another problem was that dairy processors often had severe problems in obtaining sufficient quality supplies. Suppliers may not deliver the quality or quantity of raw milk agreed to. The problems are worsened by the lack of public institutions necessary to support market-based transactions, such as for enforcing property rights and contracts. As a result of these and other exchange disruptions, companies lacked reliable supplies of quality milk while farms faced serious constraints in accessing essential inputs (feed, capital, etc.) and in selling their products.

In the absence of appropriate public institutions, private contractual initiatives have emerged to overcome these obstacles. A strategy to address these problems typically involved some form of vertical coordination. Successful vertical contracting has taken many forms, but has typically included conditions for product delivery and payments as well as farm assistance programs for suppliers. Dairy processing companies, often as part of their own restructuring, started contracting with the farms and provide inputs in return for guaranteed and quality supplies. Interviews with dairy companies suggest that one of the first actions new investors undertake as part of a company restructuring is to pay farmers on time. Farm assistance programs have taken many forms including, in some cases, input supply programs, investment

assistance programs, trade credit, bank loan guarantee programs, extension and management advisory services, etc.

Vertical Coordination (VC): Models and Enforcement

Most of the contractual arrangements in the Eastern European dairy sector are between the processor and the farm. However, there are also more complex contracts. For example, triangular structures where processors and retailers work with banks, e.g. via loan guarantee programs, to reduce financial constraints of suppliers. We found examples of this in the dairy sector in many countries (see Box 1 and table 7).

Another example of a triangular structure from Russia is the collaboration between the dairy processor Wimm Bill Dann (WBD) and the Swedish dairy equipment seller De Laval in the region of Nischnyj-Nowgorod (see Box 2). Practically all dairy farmers in the area have to modernize and upgrade their equipment and facilities, but only a few have the financial resources to do so. The program allows dairy farms to lease milking equipment. They have to cover about 20% to 30% of the costs themselves and receive the equipment based on a three to five year leasing basis. The principal balance can be paid off by the farmers through delivering the raw milk to one of the dairy processors owned by WBD. The main condition in order to take part is the compliance with WBD quality standards. The equipment is being delivered by De Laval. The project costs are shared by WBD and De Laval.

Two other interesting models are from Romania (Van Berkum 2004). First, Danone, an international food company, has developed an extensive finance scheme for dairy farms, including a triangular structure with input suppliers (see Box 3). But Danone goes further than most other companies as it takes collateral itself from farms for medium term investments for which it provides loans. Second, the Romanian dairy farmers association ISPA created a joint venture with a private milk processor ProMilch. ISPA, with the assistance of a Dutch fund, provides loans to small farmers who want to invest in animals and/or equipment. Farmers do not

have to provide any collateral; the milk delivered is considered the 'collateral'. Eligibility criteria for loans include that the farmer needs to have a durable relation with ISPA, in practice a delivery period of at least 6 months but preferably 1 year. ISPA personnel, who have close contact with member farms, need to confirm the eligibility. Trust and reliability are also important. ISPA deals with the default risk by having a solidary liability of both the loan beneficiary and the milk collection center staff who guarantee for the reliability of the loanee.

In summary, several of these institutional innovations are non-traditional mechanisms, developed to overcome specific constraints in transition economies. Contracts and incentive structures have been designed to overcome working and investment capital constraints, a weak collateral base, information and enforcement problems, etc.

The main engine behind these contracting models this is imitation and competition. Once one company introduces successful VC programs, either competitors copy these programs or suppliers shift to such processors. There is considerable evidence on this growth mechanism in the Polish (Dries and Swinnen, 2004) and in the Bulgarian dairy sector (Noev *et al*., 2005).

Enforcement

Enforcement is crucial to make any of the contracts or supplier assistance programmes sustainable. Enforcement is especially problematic in environments where public enforcement institutions are absent. Evidence suggests that court enforcement of contracts is generally not efficient; even approaches based on collateral are often flawed because either farms cannot provide the necessary collateral, or collecting in on the collateral is problematic in many circumstances in transition.

In such environments the best one can do is create "*self-enforcing contracts*" by designing the terms of the contracts such that nobody has an incentive to breach the contract (Gow and Swinnen, 2001). This can be done by increasing the costs of breaching the contract

or by introducing flexible terms which reduce the chance of breach in case conditions change unexpectedly.

However, this is not a simple exercise. There are many stories of enforcement failure. For example, Gow and Swinnen (2001) report cases of an international dairy company in Romania which ended up canceling their input pre-finance program as farms continuously diverted the inputs for other uses. In other cases, foreign investors left after they failed to obtain sufficient quality of raw materials from their supplying farms, despite extension, training, and support programs, as suppliers regularly sold produce to other companies or traders.

Even in the successful cases it took considerable fine-tuning of the contracts over time to make the contracts self-enforcing. In addition, circumstances change so rapidly in transition that contracts required continuous adjustments as the self-enforcing range itself changes. Creating the right conditions for successful and self-enforcing contracting, requires extensive knowledge of the sector and of local conditions and an ability to flexibly adjust the contract terms to circumstances which can change rapidly in transition.

Institutional innovations to ensure supplies for processors or payments for input suppliers also help to enforce contracts. Effectively, what companies do is interlinking markets. The enforcement of the credit transaction (loan and repayment) occurs through the output market. Yet, whether this is sufficient as an enforcement mechanism depends on a variety of factors, and, as the evidence shows, it may not always be sufficient.

Ultimately, the best way of solving the exchange, contracting, and collateral problems in transition countries is to base exchanges and contract enforcement on *trust*. Unfortunately due to traumatic experiences during both the communist and the transition periods, trust is generally lacking as a base for business exchanges in many transition countries. However, empirical evidence does suggest that once companies are able to successfully instigate new contractual exchange forms that trust as a basis for business exchanges can develop relatively rapidly. An

interesting example of such trust-based lending to suppliers is the ISPA/Promilch project in Romania where a dairy company collaborates with a farmers association to provide loans to small farmers without collateral. In general, the problem seems to be primarily to "get the thing going initially" and enforcement costs may decline over time.

5. DETERMINANTS OF RESTRUCTURING AND CONTRACTING

In general, the emergence of VC and success of restructuring will depend on the level of reforms in a country, other characteristics which affect private sector investment, the functioning of the rural factor markets, and sector specific characteristics. We will review here a series of factors which have affected this process.

The search for quality: public and private standards

The shortage of supply of high quality milk, which was typical of early stages of transition induced vertical coordination and farm support packages. The demand for quality comes from public and private standards. On the public side, EU regulations and standards had a very important impact on the dairy chains in accession countries and countries trading with the EU. On the private side, modern processors and retail chains impose their private high standards even in countries where consumers may not demand such standards in Eastern Europe (Dries *et al.,* 2004). There are several reasons for this. They use quality as a strategic tool and as an instrument to differentiate their products from competition. Another reason is that consistent quality standards reduce transaction costs in cross-border supply chains. Private standards also act as a substitute for missing public standards, infrastructure, and institutions.

The relationship between public and private standards is nuanced. In several cases public and private standards are complementary. For example, Van Berkum and Bijman (2004) find in their survey of food multinationals in Eastern Europe that these companies demand that

their suppliers comply with both public and company specific quality standards. In order to reach the specific quality requirement levels, most of these companies have developed programmes to assist farmers to improve their production methods.

The role of FDI

An important issue is the role of foreign investment as an engine of change. An analysis of the Polish dairy sector (Dries and Swinnen, 2004) showed that FDI has been the most important driving factor behind dairy chain restructuring and VC programs. Foreign investment plays an important role as an initiator of change and institutional innovation.

The introduction of basic forms of vertical integration requires access to outside financial sources, which foreign investors have, but which other investors also can have. However, more sophisticated forms of vertical integration, with a greater emphasis on quality and standards, are often introduced by foreign companies because they tend to pay greater attention to quality standards.

However, spillover effects lead to convergence. In the Polish dairy sector in the mid 1990s there was a significant difference between foreign owned processors and local processors. However by 2001 this gap had disappeared largely as domestic companies started copying the management practices of foreign affiliates.

The impact of supermarkets versus processors

Have (foreign owned) dairy processing companies or supermarket chains been the main drivers of change in the dairy sector? Our interviews with dairies and supermarket chains provide some evidence on this. First, supermarkets represent an important outlet for the dairy

companies in Eastern Europe.[2] For example, table 5 shows that even in Bulgaria, where FDI in retailing started later than in Central Europe small and large dairy processors sell to (foreign owned) supermarket chains. All processors sign contracts if they are dealing with supermarket chains. Second, changing procurement systems by modern retail chains had a substantial impact on dairy processors. Interviews with dairy companies in Russia and Poland showed that dairies have substantially diversified their product range as a result of demands and opportunities at the retail level. Furthermore, dairy companies that used to be limited to selling their products locally are now increasingly finding nation-wide distribution possibilities through the retail sector. Apart from the opportunities, the retail sector imposes specific requirements in terms of commercial relations (contracts) as well as production, and post-production technologies.

However, the question remains whether supermarkets are also driving structural changes at the farm level. In order to shed some light on this issue, we look at the timing of market entry of foreign owned dairy processors (as was shown earlier, these have often acted as initiators of institutional change) and the multinationalisation of the supermarket sector. In Poland, the dairy sector also attracted foreign investors early on in the transition period: Unilever in 1991; Danone in 1992; Nutricia and Bongrain in 1993; Kraft, Hochland, Schöller and Land O' Lakes in 1994; Yoplait and Hoogwegt in 1995.[3] Foreign investments in the retail sector on the other hand, peaked between 1995-1996 with major investments by chains like Ahold and Rewe.

Furthermore, we found no evidence during our interviews in Poland that the implementation of dairy assistance programs was directly linked to the increasing importance of

[2] Retail chains also go through several steps in developing and upgrading their supply chains, going from wholesale markets to preferred supplies schemes and moving to distribution centre and cross-border supply systems. For example, one can distinguish two phases in the transformation of the ECA retail system, with different types of vertical relationships with supplying farms: an (early) "*transition phase*" when privatization and market liberalization took place; and a later "g*lobalization phase*" when major investments in the retail sector by multinationals take place. Countries such as Poland, the Czech Republic, Hungary, and Poland are "first wave countries" in terms of retail transformation, starting the globalization period around 1996. Some Balkan countries such as Croatia, Romania, and Bulgaria are part of a second wave, where retail globalization started in the late 1990s. In a third wave of countries, including Russia and Ukraine, retail globalization did not really start until 2002, but is growing very rapidly now (Reardon and Swinnen, 2004).

[3] There was another wave of investments in the late 1990s and 2000.

the supermarket sector. In general, the assistance programs were initiated in the first half of the 1990s, while the major foreign supermarket chains entered the market later on. Rather, dairy processors frequently stated that upgrading their supplier base (through the use of assistance programs or strict quality policies) was guided by their wish to gain access to the EU market (i.e. to acquire an EU export license) or by the EU accession process more in general. This seems to be the general picture in the more advanced transition countries such as Polland, Czch Republic and Hungary.[4]

In Russia, which was not affected by EU accession and the associated integration of standards and markets, the picture is somewhat different and the supermarket sector is having a real impact throughout the dairy supply chain. Interviews with processing companies showed that supermarkets were putting cost and quality pressures on them, considerably beyond their non-supermarket outlets. This was particularly the case for the dairy systems outside of the main consumer markets (such as Moscow and St. Petersburg). The spread of the major retail chains to the provinces happened before modern dairy investments. In these regions, it is the retailers that are the frontrunners and who are driving the changes. Metro, Ramenka and all the big local retailers have recently been investing heavily in major cities all over Russia. The modern dairies, and especially foreign dairy investors, are still struggling to get their quality chains organized around Moscow where there is a strong competition to get the good milk suppliers.

In summary, in countries close to the EU (either in terms of accession or in terms of trade), the restructuring of the dairy chain was mostly driven by investments in processing, while in countries further from the EU, and less advanced in transition, retail investments are playing a more important role in driving change throughout the dairy chain. That said, the growth of supermarkets is having a significant and growing effect also in Central Europe, not so

[4] In Bulgaria, the first major foreign investment in the dairy sector was made by Danone in 1993. However, the rest of the dairy FDI came around the same time as retail FDI. Foreign-owned supermarkets arrived in 1999 with Metro. It was followed by Austrian, Turkish, Greek and other investments in the retail sector.

much in terms of quality, but in terms of price and other demands being imposed on the upstream companies.

Reform and restructuring

The previous shows how dairy chain restructuring is affected by investments in processing, supermarkets and stages of transition. Obviously, all these factors are themselves affected by more fundamental changes, such as series of reforms that have influenced the investment climate, market imperfections, constraints, etc. all of which had an important impact on the dairy chain restructuring and investments.

The absence of foreign or domestic investments typically reflects political or economic instability, insecure property rights, and the absence of key reforms.[5] An analysis of delayed FDI in Slovakia confirm that poor government policies are a major constraint for investments. More generally, this is illustrated by Figure 4 which shows a very strong positive correlation between reform progress in transition countries and investments by multinational retailers.

The reform progress had also an important impact on contracting and VC as key reforms are needed to facilitate contract enforcement. This can be concluded from a comparison of farm assistance programs in countries at various reform stages. Tables 6 and 7 shows the forms of investment assistance being offered by dairy companies to their suppliers in each country in Poland, Slovakia, Bulgaria, and Romania based on a series of interviews in the four countries with quite different farm structures and at different stages of transition.

In Poland, each of the dairies has an input supply programs in which they provide access to inputs such as feed (or seeds and fertilizers for on-farm feed production). Five out of six companies assist farm investment through credit programs. Most of the companies also provide extension services to their suppliers. Five of the dairies provide guarantees on bank loans made

[5] See e.g. the 2005 World Bank report on "Improving the Investment Climate".

to farmers, most of which include preferential interest rates. Most also co-sign bank loans when farmers lack sufficient collateral.

In Slovakia, all dairies assist farms through credit programs for dairy specific investments. Three of the six interviewed companies assist their suppliers in accessing inputs. Most of the companies also provide extension services. Three of the dairies provide guarantees on bank loans made to farmers. The respondents indicated that they offer these types of programs in order to upgrade milk quality and to secure their supplier base against loss to other dairies who do offer these valuable services.

Even in Bulgaria, the country least advanced in reforms and transition and which displays the lowest degree of vertical coordination, most of the 11 interviewed dairies offer assistance to their suppliers. Nine companies assist farms through credit programs for dairy specific investments, with two of these indicating that they also offer credit for general investments. Ten of the selected dairies assist their suppliers in accessing inputs for on-farm feed production. The majority also provides extension services. Five out of the eleven companies offer bank loan guarantees. Securing the supply base is indicated as the main reason for offering these programs in almost all cases.

The share of companies offering assistance has increased in all three countries. Dairy companies in Poland implemented assistance programs quickly. In Bulgaria, the number of dairy companies offering assistance increased gradually. In Slovakia, the increase in assistance accelerated after 1998, consequent with increased inflows of FDI. Programs initiated through the use of FDI may have forced local dairies to implement assistance programs in response to increased competition as well as providing examples for local dairies to emulate.

Two countries, which are even less advanced, are Romania and Azerbaijan. Both are characterized by a small scale dairy farms and domination of street sales of milk.[6] However, since 2000 there have been major changes in Romania, where growing FDI has induced important changes. VC and contracting has developed rapidly with FDI. Interviews show that the large dairy companies contract with small and large farms and offer their farmers assistance programmes. Improving milk quality and securing the milk supply base are the major reasons behind offering these assistance programmes. Extension services include support to farmers from making feeding plans for their herd, how to increase milk quality, cleaning practices and also full business plans. Several dairies provide pre-financed inputs and medium-term investment credits. However, most dairies offer these services only to larger farms.

No such change has occurred in Azerbaijan due to absence of FDI. Vertical linkages are almost non-existent in the dairy markets, and the local industry remains weak.[7] A particular problem of the Azeri production system is the lack of basic infrastructure such as reliable energy supplies. Regular electricity disruptions in rural areas prevent investments in basic mild cooling and processing equipment.

To estimate the cross-country impact of reforms on VC, we compared the importance of VC, as measured by our surveys (see tables 6 and 7), and an index of reform progress estimated by EBRD. This relationship is in figure 5 which indicates a strong positive effect of the progress in economic reforms on farm assistance programs.

In summary, these findings for the dairy sector support key hypotheses that (a) VC is growing in the ECA region, (b) that its emergence is strongly influenced by reform policies; (c) that VC starts first with input support, extension and simple credit programs. Later more

[6] In Romania over 95% of all farms have 1-2 cows. Only 20-25% of the milk production is processed. Farm use and direct sales on street markets are the main outlets. The processing industry is very fragmented; there are around 550 dairies of which 250 have a capacity of less than 1000 ton/year. The six largest dairy companies account for 25% of dairy processing. In Azerbaijan dairy farms are also small and less than 10% of the dairy products sold on the market are processed by the industry. Most of the products are sold directly from the farmer to the customer.

[7] Similar can be observed in Albania where VC is also weak and no assistance from processors to suppliers is provided, apart from one case discovered from our survey.

sophisticated programs, such as bank loan guarantees and investment loans are developed; (d) that VC is very important in the most advanced ECA countries and that less advanced ECA countries will converge to this. Evidence from other countries and sectors largely confirms this picture.

6. IMPACTS

The impact of these contract innovations is difficult to quantify as several other factors affect output simultaneously and as company level information is difficult to obtain. Still, the evidence we collected from several surveys and a series of case studies suggests that successful private contract enforcement with vertical contracting has important positive effects, both direct and indirect.

Payment delays : As a result of supply chain restructuring and vertical coordination, exchange and payment problems have been importantly diminished. Table 8 shows how payment delays affected more than one-third of the dairy farms in Bulgaria throughout the 1990s, but have declined significantly in recent years. The average length of the payment delay has also declined and in 2004 is some 27 days, about 2.5 times less than during initial transition years.

Supplies and productivity: Farms have experienced beneficial effects on output, productivity and product quality through better access to inputs, timely payments, and improved productivity with new investments. Relatively small changes in the industry's practices can already have a major impact at the farm level. In 2001 the Dutch "Friesland" company bought a Romanian dairy, which utilised less than 50% of its capacity and had a bad reputation with respect to paying its farmers. Without changing anything but paying-in-time, Friesland succeeded in taking-in 20-30% more milk within a time period of 3 months. If farmers are convinced that a processor is reliable in making its milk payments, producers are generally prepared to deliver (more of) their milk (Van Berkum, 2004).

In their survey of ECA agri-business enterprise executives, White & Gorton (2004) concluded that various contract support measures had caused an average increase in yields of 9.6 %. The measures with the greatest impact on yields were specialist storage (especially cooling equipment in the dairy sector), veterinary support and physical inputs. Specialist storage in the form of on-farm cooling tanks has been particularly important in raising yields and quality in the dairy sector, an effect also found in other countries (Dries, 2004). Market measures such as prompt payments, guaranteed prices, and market access also had significant positive effects.

Quality of output also improved due to these measures, as evidenced by increases in the percentage of output reaching higher or basic quality standards in response to specific programs. The programs with the greatest impact on quality were quality control support, veterinary

support, physical inputs, market access and prompt payment programs. Firms that saw an increase in product quality procured a significantly greater proportion of agricultural raw materials using contracts and also employed a significantly greater number of contract support measures.

Figures 6 shows how milk quality rose rapidly following contract innovations by dairy processors that were introduced in Poland in the mid 1990s, in Bulgaria at the end of 1990s and in Russia in 2000. In Poland, the share of the market held by highest quality milk increased from less than 30% on average in 1996 to around 80% on average in 2001. In Bulgaria, extra quality milk increases from 17% on average in 1997 to 34% in 2003 combined with decline in the average shares of the lowest quality milk, from 20% in 1997 to 10% in 2003. In the Russian Campina factory, the share of the highest quality milk increased from 6% in 2000 to 55% in 2004, while the lowest quality fell from 37% to less than 10% over the same period.

Investments and access to credit: Direct loans and loan guarantee programs contributed strongly to farm investments in small and medium dairy farms in North Poland (Dries and Swinnen, 2004). More than three quarters (76%) of all farms made investments in the past years after vertical coordination was implemented, including many small farmers. Of those who invested, 58% used loans for investments in enlarging and upgrading the livestock herd (30%) and cooling tanks (56%). Also, programs which assist farms in accessing inputs (mainly feed) enhance investment indirectly by lowering input costs, or reducing transaction costs in accessing inputs, and consequently, through improved profitability. Figure 7 illustrates the strong impact on investment in equipment, in particular cooling tanks, for small dairy suppliers.

7. (SMALL) FARMERS IN THE CHAIN

A key concern is that this process of vertical coordination will exclude a large share of farmers, and in particular small farmers (e.g. Reardon and Berdegue, 2002). There are three

important reasons for this. First, there is an important fixed transaction cost component in costs of exchanges between farms and companies, making it more costly for companies to deal with many small farmers than with a few larger suppliers. Second, another reason, is when some amount of investment is needed. Small farms are often more constrained in their financial means for making necessary investments, either because they do not have sufficient own resources or because they have problems accessing external funds in imperfect rural financial markets. Third, small farms typically require more assistance from the company per unit of output, because they may lack essential management capacity or investments. For example, before the vertical integration process started, large dairy farms in Slovakia had cooling tanks and dairy specialists, while small Polish dairy farms had neither.

However, what *empirical evidence* do we have on the exclusion of small farms? Our surveys and interviews with companies generally confirm the main hypotheses that transaction costs and investment constraints are a serious consideration. Companies express a *preference* for working with relatively fewer, larger, and modern suppliers. However, our empirical observations also show a very mixed picture of *actual* contracting, with much more small farms being contracted than predicted based on the arguments above.

Companies in reality work with surprisingly large numbers of suppliers and of surprisingly small size. Even studies pointing at challenges facing small farmers in evolving modern supply chains find that small and medium farmers can be successfully integrated in the chains, with processing and trading companies actively investing in institutions and infrastructure to reduce transaction costs, such as collection centers. For example, Friesland Romania, a subsidiary of the Dutch FCDF group, entered the Romanian market in 2000, and three years later had 5 factories. The company purchases milk from approximately 40,000 small farmers through 1,050 collecting points and from some 600 larger farms (van Berkum, 2004).

Friesland owns the collection points and upgraded them by investing in cooling and inspection facilities.

In Poland, we found that VC and increased quality requirements had positively affected the survival and growth of small dairy farms. 283 households in the sample delivered milk to dairy processing companies in 1995. Of these, only 36 (13%) stopped delivering milk between 1995 and 2000. Ten of them (4%) stopped producing altogether while the rest kept some cows for home consumption.[8] Hence, 87% continued delivering to dairies despite radical restructuring of the dairies and tightened quality demands.

Also White and Gorton (2005) find no evidence that small farmers have been excluded over the past six years in developing supply chains in five countries (Armenia, Georgia, Moldova, Russia and Ukraine). In the vast majority of cases companies have the same or smaller farmers in 2003 than in 1997. In fact, 57% of the processors have more small suppliers in 2003 than in 1997. Moreover, the processing companies indicate, on average, that they are not likely to cut suppliers in the future.[9]

Often, supplier programs differ to address characteristics of varying farms. For example, in case studies of dairy processors in Moldova, Poland and Romania, we find that investment support for larger farms include leasing arrangements for on-farm equipment, while assistance programs for smaller dairy farms include investments in collection units with micro-refrigeration units.

More sophisticated supplier assistance programs tend to be more available for larger farms. In Slovakia, three out of six interviewed companies said that farms need to have a minimum size to qualify for investment support; one indicated that only the bigger and better quality suppliers were allowed to use the (forward) credit program. In Bulgaria, five domestic

[8] Most of those who stopped delivering probably would have stopped anyhow: the average age of those who stopped producing is 56 years, compared to 45 years for the entire sample.

[9] Interestingly, for those that expect to deal with less suppliers in the future, this expectation is based mostly on choices made by farmers themselves who may move out of small-scale agriculture and into more rewarding activities either inside or outside agriculture as the economy is improving.

dairies indicate that they set a minimum size for farms to qualify for their programs. Danone explicitly limits assistance programs to contracted suppliers. Meggle's programs are limited to large suppliers by default since only farmers with large milk quantities can deliver to Meggle.

Also White and Gorton (2005) find evidence that better and more assistance seems to go to larger farms, although there is significant variation with the type of assistance.[10] For example, there is little difference in the provision of quality control, guaranteed prices, agronomic support, prompt payments, or even farm loan guarantees between small and large suppliers. However, the majority of companies operate a minimum supplier size for providing credit, physical inputs, machinery etc.

Why contracting with small farmers?

Hence, despite the apparent disadvantages noted earlier, the empirical evidence suggests that vertical coordination with small farmers is widespread. The question is why? There are several reasons.

First, the most straightforward reason is that companies have no choice. In some cases, small farmers represent the vast majority of the potential supply base. For example, over 95% of dairy "farms" in Albania, Bulgaria and Romania have less than 5 cows. Hence any dairy processor needs to deal with small farms by necessity, focusing for example on investments in collection points etc. rather than on-farm equipment.

Second, processors may prefer to deal with large farms because of lower transaction costs in e.g. collection and administration, but contract enforcement may be more problematic, and hence costly, with larger farms. In several interviews company managers indicated that (smaller) family farms were less likely to breach contracts or to divert company investments than large co-operatives or farming companies. Therefore, processors may prefer a mix of suppliers.

[10] They define "small farm" as having less than 5 cows (in dairy) or operating less than 1 hectare.

Third, small farms may have cost advantages in labor intensive, high maintenance, production activities such as dairy.

Fourth, processing companies differ in their willingness to work with small farms. Some processing companies work with small suppliers even if others do not – this may reflect the companies' roots as cooperative organizations. For example in the Romanian dairy sector, Friesland, and especially ISPA and Raraul seem to be more inclined to work with small farms than Danone, reflected in the way they assist small suppliers and invest in overcoming transaction costs (see table 9). All of them contract many small farms. Friesland has invested significantly in collection centers. Raraul and Promilch/ISPA take care of the collection and transport themselves. ISPA, a dairy association, further provides basic farm support (feeding, milk quality and hygiene). This example shows that small-scale farmers may have future perspectives when effectively organised.

That said, even companies willing to invest in upgrading small farms only go so far, and tend to have a strategy in the long run to upgrade part of their supply here to larger, more efficient, and fewer suppliers. Yet, in countries like Poland, Romania, and many CIS countries dominated by household dairy production, "large" is a relative concept. As Van Berkum (2004) puts it: "*In Romania, large farms are farms with more than five cows"*.

The Farm Assistance Paradox

The evidence presented so far suggests an interesting paradox. Small farmers in ECA may not be able to make the necessary upgrades to satisfy the demand of modern supply chains without support packages by processors or agribusiness. If there are sufficient (quality) supplies available for processors, they have no interest in introducing such VC support packages. If there are not sufficient supplies, VC will be forthcoming. Hence, we have the paradoxical situation that small poor farms may be best off (in the perspective of "supply chain driven development") if they are in an environment which is dominated by small financially constrained farms.

There is some empirical evidence for this hypothesis. Companies seem to be most likely to reach out to small farms when they face a supplier base which is dominated by small farmers not able to supply the commodities they want, and least likely when there is a heterogeneous farm structure with some farms able to deliver the desired supplies. For example, some international dairy companies and foreign investors target larger farms as their preferred suppliers and only reach out to smaller suppliers if they need them to secure supplies. For example, in the case of dairy processors, the same processors have different minimum size thresholds for different countries, reflecting the structure of the farm sector in these countries. An international comparison suggests that in Hungary, with many medium and large farms, suppliers have to have more than 20 cows; in Poland, with many small farms, more than 5 cows, and in Romania, where almost the entire herd is in semi-subsistence farms, processors work with farms with 2 cows.

Vertical Integration and Rent Distribution

Another potential equity problems with the vertical coordination process is the possibility of rent extraction by the processor or the retailer. By introducing an interlinked contract, farms can access credit, inputs, etc. which was unavailable before and processing companies can have access to higher quality and timely supplies. Productivity and income increase for the chain as a whole. However, a key question is who benefits from this increase in efficiency and total income? If both the farm and the processor benefit from the institutional innovation, everybody is better off.

However, the very rationale for the emergence of these vertical coordination institutions may at the same time act as a barrier to entry for other companies and may give the dominant partner in a transaction additional leverage. If the processing firm can set the terms of the contract such that it captures most or all of the rents, the productivity growth may not benefit the

farms. Moreover, if the interlinking of transactions bestows additional monopoly power upon the processing company, the farm's income could even be lower after the contract innovations, despite the fact that total income has improved.[11]

Hence, an important issue is how to combine efficiency gains with an equitable distribution of the benefits in the chain. Competition an important role in this process. Competition prevents companies from exercising monopoly power in the design of the contract conditions and makes it more likely that the farms share in the benefits.

Empirical evidence on these issues is limited and one should be careful drawing conclusions. Preliminary evidence from the dairy chains suggests that so far in Eastern Europe both farms and processors benefit from private-sector-induced vertical coordination, and that there is substantial competition among dairy processors.[12]

The main reason is that the collapse of farm output and livestock numbers created a gap between processing capacity and supply, and hence excess demand. There is even more excess demand for high/better quality supplies because quality is low due to (a) a history of poor quality in the system and (b) reduced access to inputs and finance affect the quality as well.

This makes Eastern Europe a "*suppliers market*" and this, in turn, supports the farms' bargaining position vis-à-vis the processing sector in the distribution of supply chain rents.[13] Moreover, in cases where quality supplies are scarce and non-trivial investment is required for

[11] See Bardhan (1989) and Bell (1989) for an analysis of these equity effects in developing countries in the framework of landlord-tenant transactions.

[12] Rent extraction seems most problematic where governments are directly or indirectly involved in restricting competition, as e.g. in some Central Asian cotton chains (Swinnen, 2005).

[13] Codron et al (2004) argue that also in Morocco and Turkey, where there is also a shortage of preferred suppliers to retail chains, these suppliers have strong bargaining power ("most of them have more bargaining power than the retailer") because, first, as modern retailing of FFV is still in its infancy, there are only a few modern and large grower-shippers, and, second, with a high price gap between exported produce and local produce, the cost of contract termination for the suppliers is small since they can get the high export price for their high quality products.

quality upgrading, the bargaining power of quality suppliers may increase substantially (post investment) vis-à-vis the processor or trader.[14]

These arguments are important both for the issue of exclusion and for the rent distribution in the chain because it suggests that the "power relationship" (and the rent distribution) is endogenous in the development of the supply chain integration.

However, if competition among suppliers increases, or if demand falls, pressure on processors may lead to a consolidation of the supplier base. At this point there is no systematic evidence that this is happening in ECA. However, there is some ad hoc information from the most advanced countries, which suggest that this may be starting. Studies from other parts of the world, in particular emerging markets in Latin America, suggest that these pressures may be real and important (Reardon and Berdegué, 2002, Berdegué *et al.* 2003).

8. CONCLUDING COMMENTS AND DISCUSSION

The transition process in Eastern Europe has caused tremendous restructurings of the dairy chains. Farms and companies were privatized. In many countries this resulted in a fragmentation of the dairy farms, with dairy now being produced on small family farms.

At the same time, the dairy sectors were confronted with global markets and investments by foreign companies in processing and retailing. These investments and opening to international markets have introduced higher standards, leading, in turn, to extensive contracting and vertical coordination in the dairy chain. The evidence in this paper indicates that there have been large efficiency gains throughout the chain as a result, especially since the late 1990s.

In countries close to the EU the restructuring of the dairy chain was mostly driven by investments in dairy processing, while in countries further from the EU, and less advanced in

[14] Studies on international FFV supply chains in East Africa also find that with increasing demand for traceability, the "dependency relationship" between suppliers and processors changes; as processors/traders are now more dependent on their suppliers. By working with fewer suppliers, but with higher quality and traceability contracts, the suppliers become more "powerful" – and tend to get higher prices.

transition, retail investments are playing a more important role in driving change throughout the dairy chain.

There important equity issues. So far survey evidence suggests that the impact on small farms has been quite positive. Future impacts will be nuanced. First, the impact differs significantly between countries. The timing and extend of retail and processing investment differs strongly, reflecting country differences in economic reforms and government policies. Also, while in many Eastern countries small farms dominate, e.g. in Slovakia, in others dairy output is still mostly produced by large corporate farms.

Second, the impact of VC is likely to be a continuation of important chain restructuring which started fifteen years ago. Besides privatization, this included a massive outflow of labor. In countries, such as Estonia, Hungary, the Czech Republic and Slovakia, more than 50% of (officially registered) workers left agriculture early on in transition.[15] This process continued as investments in the food industry and the need to enhance the international competitiveness of the domestic farms have continued pressure for restructuring. In other countries this adjustment process has been delayed by a variety of problems, but has started since 2000 and a significant reduction in agricultural employment will be necessary with economic growth, with or without VC and supermarkets.

Third, the VC has positive effects by addressing major weaknesses of the dairy farms. The sector is in need of finance for investments, technology and quality improvements, and access to high value markets. All these factors weaken the competitiveness of supply chains. Investments by modern processing companies and vertical coordination with suppliers can play a significant role in addressing these weaknesses and improving the global competitiveness of the supply chains. Moreover, instead of excluding small farms, private supplier assistance schemes seem to reach many small farms which are left out of government programs. For

[15] The average annual decline in agricultural employment in the first wave countries Hungary, Czech Republic and Poland was -12% in 1989-1992, -6% in 1993-1997, and -4% in 1998-2001 (Swinnen *et al.*, 2005).

example, recent World Bank studies on the Lithuanian and Slovakian dairy sectors show that small farms do not get access to government programs or EU support such as SAPARD. For them, the only source of credit and finance is supplier credit from restructured dairy processors.

Fourth, modern retail and dairy company investments will not only affect farms, but will have a wider impact on rural development. This includes improved access to better quality and a wider variety of foods and other products for rural households, and the creation of off-farm employment, directly or indirectly, in the supply chain. Investments in processing, quality control, extension services etc. are likely to create new jobs in the rural areas; while at the same time the competition from the new chains will cause traditional shops and processors to close. Modern retail and dairy companies, as motors of market development, will also generate opportunities for differentiation of products and value added.

In summary, these arguments suggest that modern supply chains have the potential for important positive implications for rural households in Eastern Europe, despite the challenges that they pose. These investments may bring very significant benefits to the region, but could also pose significant threats where inefficient or undercapitalized farmers cannot "make the grade." It is important for policy to focus on the most effective and appropriate methods for developing "win-win" solutions for companies and farmers.

9. REFERENCES

AgraFood East Europe, March 2003, p.23.

Agra Europe, April 2003.

Albanian Ministry of Agriculture and Food, 2004, *2004 Annual Agricultural Report*, 143 pages.

Bardhan, P. (ed.), 1989, *The Economic Theory of Agrarian Institutions*, Clarendon, Paperbacks.

Bell C., 1989, "*A Comparison of Principal-Agent and Bargaining Solutions: the Case of Tenancy Contracts*", in Bardhan, P. (ed.) The Economic Theory of Agrarian Institutions, Clarendon, Paperbacks.

Berdegue, J., F. Balsevich, L. Flores, T. Reardon, 2003, Supermarkets and Private Standards for Produce Quality and Safety in Central America: Development Implications, *Report to USAID under the RAISE/SPS Project*, Michigan State University and RIMISP, July.

Codron, J-M., Bouhsina, Z., Fort, F., Coudel, E. and A. Puech, Supermarkets in Low-income Mediterranean Countries: Impacts on Horticulture Systems, *Development Policy Review*, Sep2004, Vol. 22 Issue 5, p587-602.

Cungu, A. and J. Swinnen, 1999, Albania's Radical Agrarian Reform, *Economic Development and Cultural Change*, 47(3): 605-619.

Dries, L., 2004, "Vertical coordination and foreign direct investments in the dairy sector in Central Eastern Europe", *paper prepared for World Bank project EW-P084034-ESW-BB* "Dynamics of Vertical Coordination in ECA Agrifood Chains: Implications for Policy and Bank Operations", 32 pages.

Dries L, Reardon T, and J. F.M. Swinnen, 2004, The rapid rise of supermarkets in Central and Eastern Europe: implications for the agrifood and rural development, *Development Policy Review*, vol. 22, no. 5, pp. 525 – 556.

Dries, L. and J. Swinnen, 2004, "Foreign Direct Investment, Vertical Integration and Local Suppliers: Evidence from the Polish Dairy Sector", *World Development*, Vol. 32, No. 9, pp. 125-1544.

Dries, L. and J. Swinnen, 2005, "Impact of food retail investments: evidence from Czech Republic, Slovakia, Poland, and Russia", *Invited presentation* at the Annual EastAgri Conference special session on The Dynamics of Vertical Co-ordination in Agro-food Chains in Europe and Central Asia, 28 February 2005, Rome, Italy.

EBRD, 2003, *EBRD Transition Report 2003*, London, UK.

EBRD/FAO, 2005, Impact of Food Retail Investments on the Food Chain, FAO Investment centre / EBRD Cooperation Programme, *Report Series N° 6.*

Gorton, M., A. Buckwell and S. Davidova, 2000, "*Transfers and Distortions along CEEC Food Supply Chains*", in Tangermann, S. and M. Banse (eds), Central and Eastern European Agriculture in an Expanding European Union, Wallingford Oxon: CABI Publishing, 89-112.

Gow, H. and J. Swinnen, 1998, Up- and Downstream Restructuring, Foreign Direct Investment, and Hold-Up Problems in Agricultural Transition, *European Review of Agricultural Economics*, 25(3): 331-350

Gow H. and J. Swinnen, 2001, Private Enforcement Capital and Contract Enforcement in Transition Economies, *American Journal of Agricultural Economics*, 83(3), pp. 686-690

Gow, H., Streeter D. and J. Swinnen, 2000, "How Private Contract Enforcement Mechanisms Can Succeed Where Public Institutions Fail: The Case of Juhosucor A.S." *Agricultural Economics*, 23(3): 253-265

Ministry of Agriculture and Forestry, 2004, *Annual Agricultural Report*, Sofia, Bulgaria.

Noev, N., Dries, L. and J. Swinnen, 2005, Growth, Contracts and Quality in Transition Agriculture: Evidence from the Bulgarian Dairy Sector, *PRG Working Paper 2005/3*, Research Group on Food Transition and Development (PRG-Leuven), K.U. Leuven, Belgium, 63 pages.

Reardon, T. and J.A. Berdegué, 2002, "The Rapid Rise of Supermarkets in Latin America: Challenges and Opportunities for Development.", *Development Policy Review* 20(4): 317-34.

Reardon, T. and J. Swinnen, 2004, "Agrifood Sector Liberalization and the Rise of Supermarkets in Former State-controlled Economies: Comparison with Other Developing Countries", *Development Policy Review*, Vol. 22, No. 5, pp. 515-524.

Swinnen, J.F.M., 2005, When the Market Comes to You - or Not. The Dynamics of Vertical Coordination in Agri-Food Chains in Transition. *Final report of the World Bank (ECSSD) ESW* on "Dynamics of Vertical Coordination in ECA Agrifood Chains: Implications for Policy and Bank Operations", Worldbank, Washington, DC.

Swinnen, J.F.M., L. Dries and K. Macours, 2005, "Transition and Agricultural Labour", *Agricultural Economics* 32(1): 15-34.

USDA, 2003, Retail Sector in Bulgaria, *USDA GAIN Report No.3015*, 16 pages..

Van Berkum, S., 2004, "Dynamics in vertical coordination in the Romanian dairy sector", *Report for the World Bank Study* on "Dynamics of Vertical Coordination in ECA Agrifood Chains: Implications for Policy and Bank Operations", Worldbank, Washington, DC.

Van Berkum, S. and J. Bijman, 2004, "The Impact of Foreign Investment on Supply Chains in ECA: Lessons from a Survey of Dutch Agri-food Multinational Companies", *Report for the World Bank Study* on "Dynamics of Vertical Coordination in ECA Agrifood Chains: Implications for Policy and Bank Operations", Worldbank, Washington, DC.

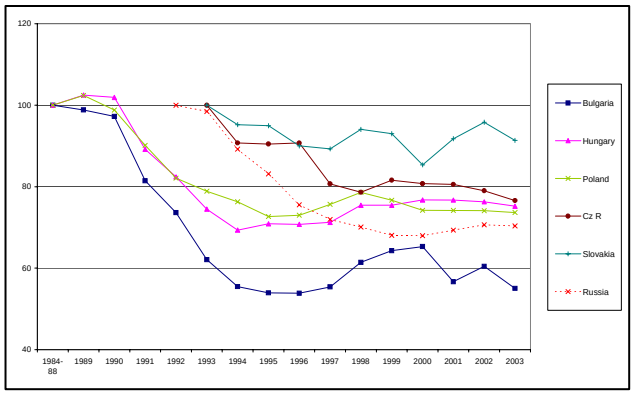
Walkenhorst, P., 2001, "The Geography of Foreign Direct Investment in Poland's Food Industry", Journal of Agricultural Economics, 52(3), pp.71-86.

White, J. and M. Gorton, 2004, *Vertical Coordination in ECA Agrifood Chains as an Engine of Private Sector Development: Implications for Policy and Bank Operations*, Worldbank, Washington DC.

World Bank, 2005, "Improving the Investment Climate for Growth and Poverty Reduction", *World Development Report*, forthcoming, Washington DC.

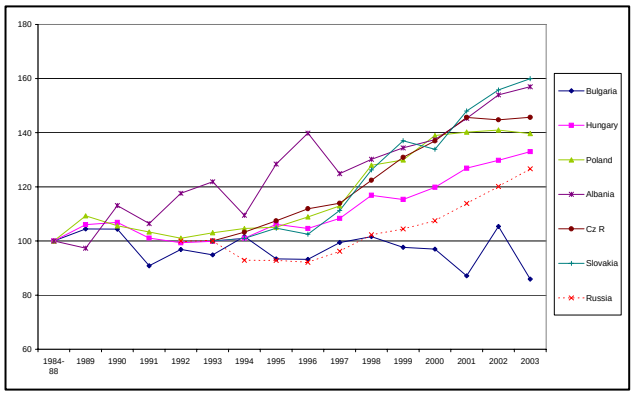
Figures and Tables

Figure 1. Change in cow milk output in selected CEE countries, %, 1984-88=100*



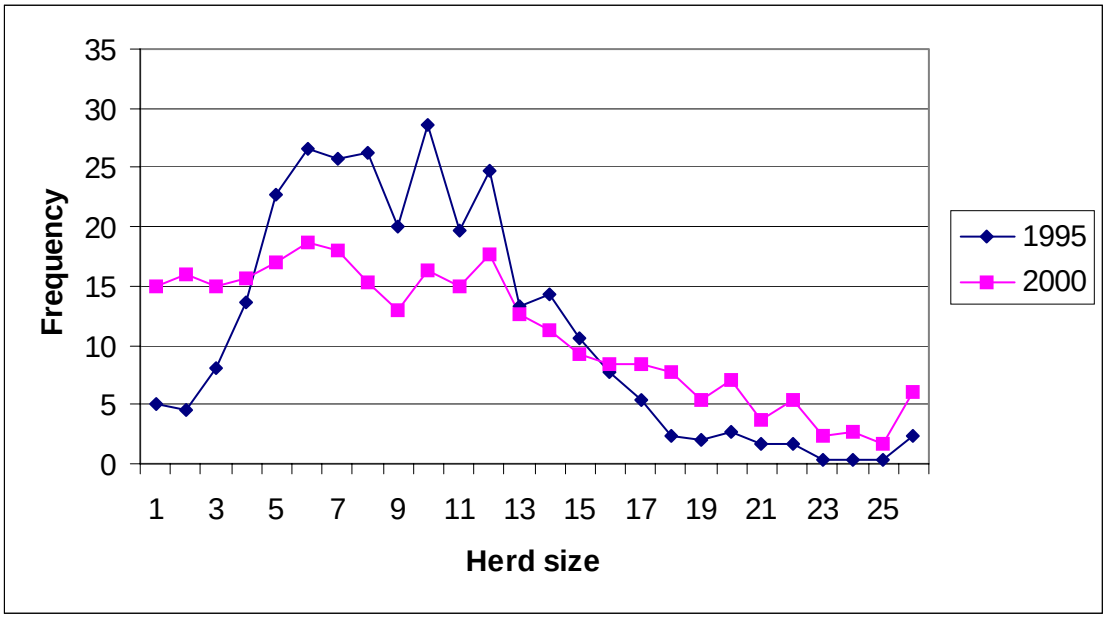
Note: * 1992=100 for Russia, and 1984-88=1993 for Czech Republic and Slovakia
Source: Author's calculations based on FAOSTAT data

Figure 2. Change in cow milk yields in selected CEE countries, %, 1984-88=100*



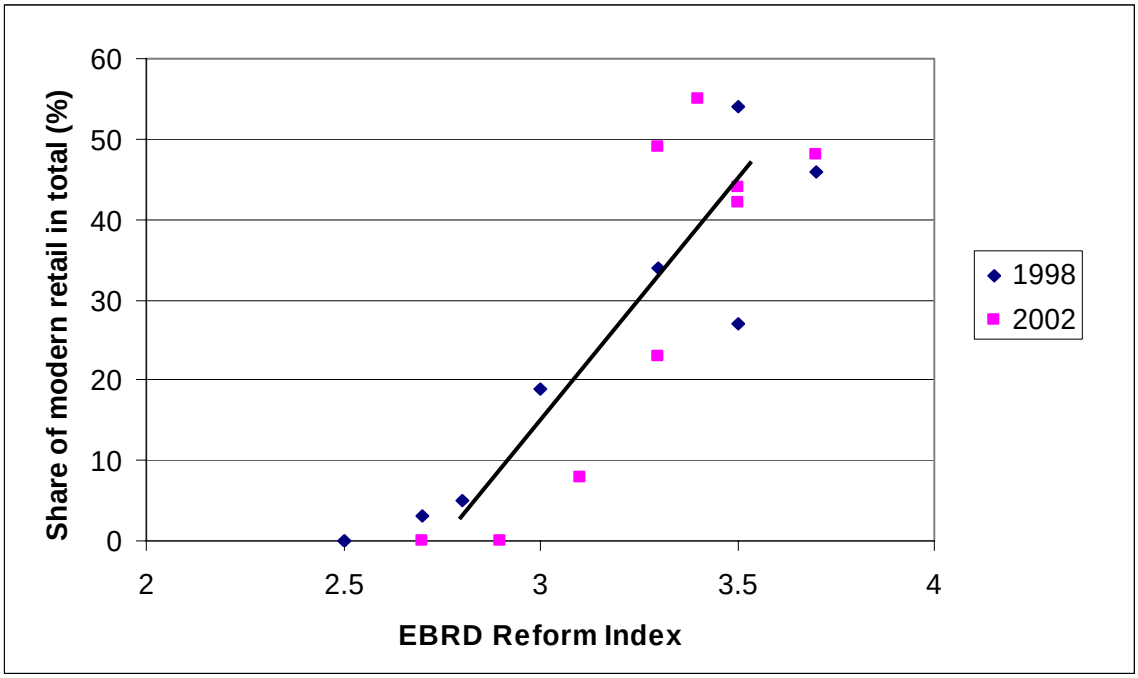
Note: * 1992=100 for Russia, and 1993=100 for Czech Republic and Slovakia
Source: Authors' calculations based on FAOSTAT data

Figure 3. Size distribution of dairy farms in total survey sample from Poland*



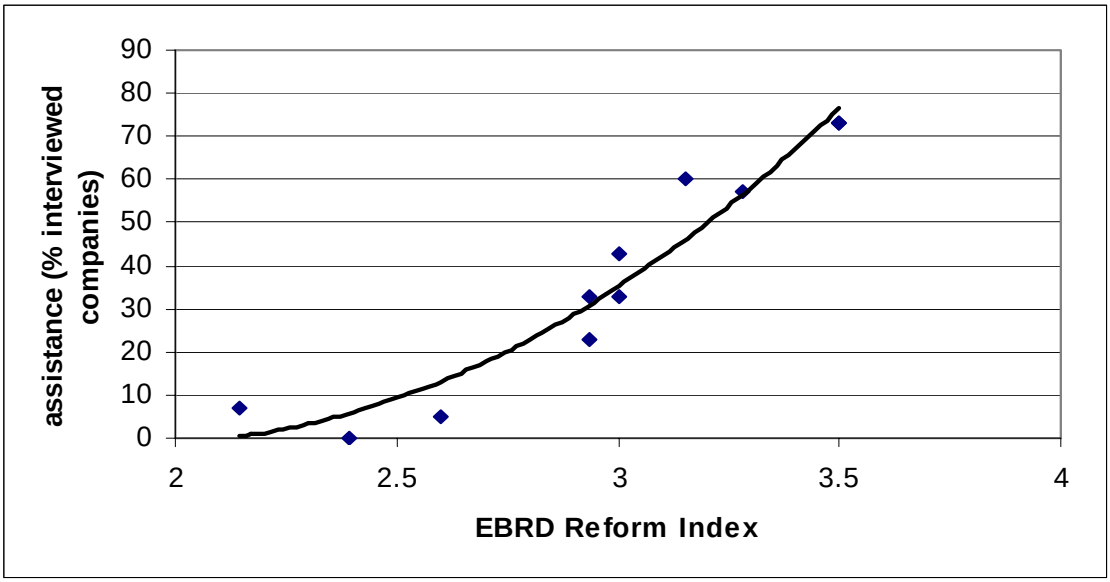
Note: * Each data point gives the average frequency of farms in three consecutive size classes of which the data point itself is the size class in the middle. For example, the data point for herd size three signifies the average number of farms with herd sizes 2, 3 and 4.
Source: Dries and Swinnen, 2004

Figure 4. Impact of economic reforms on the growth of the modern retail sector in ECA*



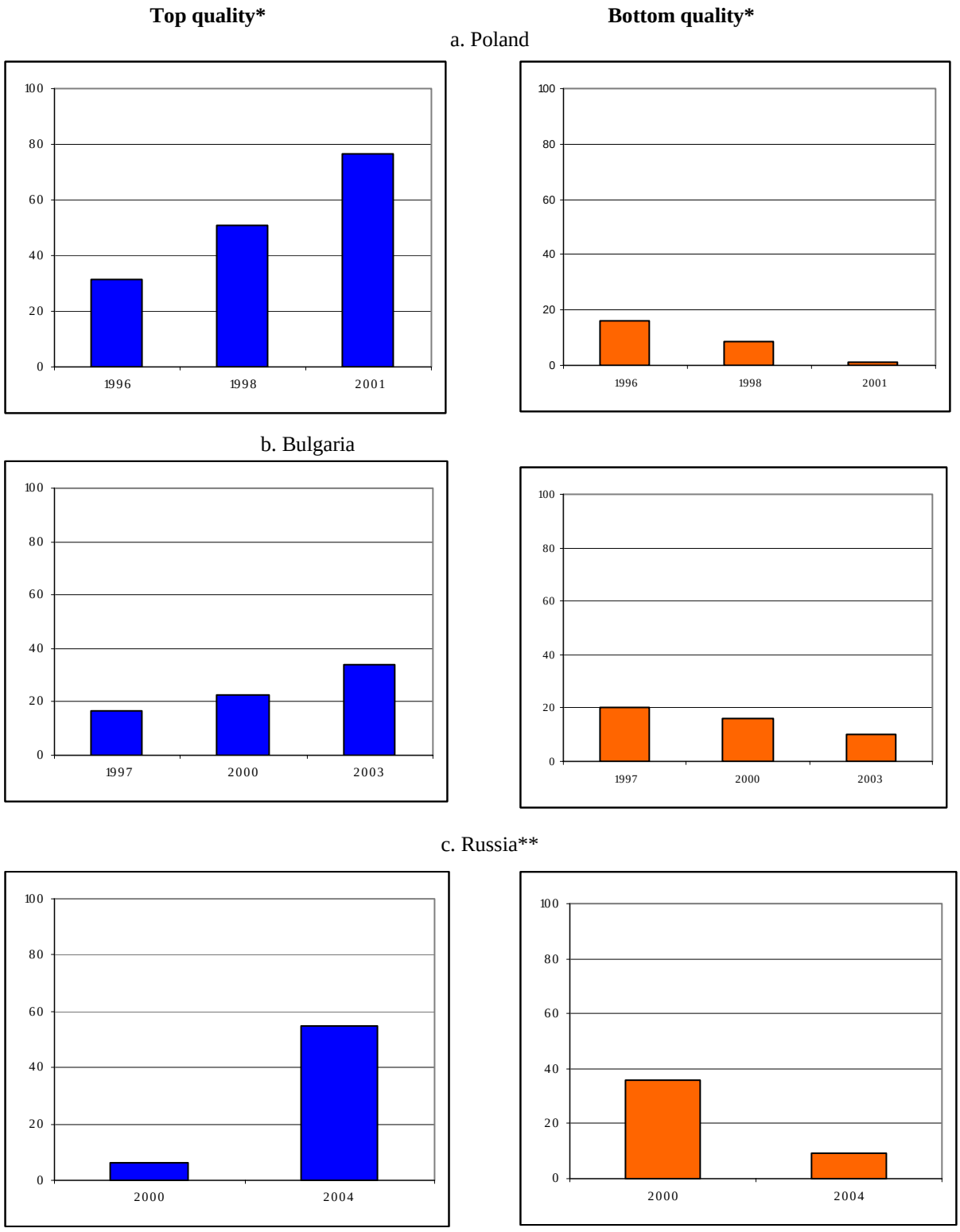
Note: * Correlation (R^2) is 0.79. Data include Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Ukraine
Source: Dries, Reardon and Swinnen, 2004

Figure 5. Impact of economic reforms on farm assistance programs in the ECA dairy sector*



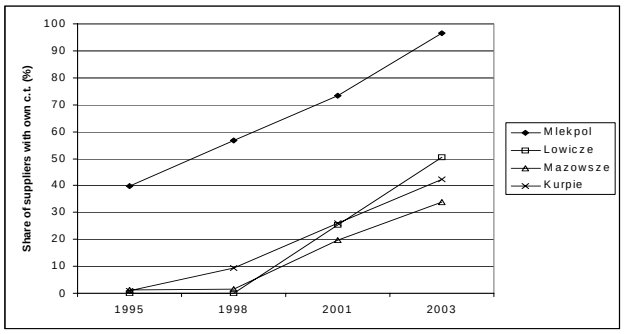
* Data include observations from Albania, Bulgaria, Poland, Slovakia
Source: Dries and Swinnen (2005)

Figure 6. Change in milk quality in Eastern Europe



Note: *Average share in total milk supply; ** Milk deliveries to the Campina factory in Stupino.
Source: Authors' survey results for Poland and Bulgaria; EBRD/FAO (2004) for Russia.

Figure 7. Growth in dairy farm investments in Poland 1995-2003 (% of suppliers with own cooling tanks for Northern Polish dairies)



Source: Dries (2004)

Table 1. Main dairy indicators in selected CEE countries, 1984/88-2003

Country	# dairy cows (' 000 heads)			Milk output (' 000 tons)			Milk yields (tons/year)		
	1984-88	2003	% change	1984-88	2003	% change	1984 - 88	2003	% change
Albania	245.1	435.0	77.5	321.0	895.0	178.8	1.31	2.06	57.3
Bulgaria	639.7	410.0	-35.9	2160.2	1188.8	-45.0	3.37	2.9	-13.9
Czech R.**	874.1	459.6	-47.4	3453.8	2645.7	-23.4	3.95	5.76	45.8
Slovakia**	386.0	220.5	-42.9	1250.0	1142.2	-8.6	3.24	5.18	59.9
Hungary	587.7	332.0	-43.5	2792.1	2100.0	-24.8	4.76	6.33	33.0
Poland	5226.5	2750.0	-47.4	16020.9	11803.7	-26.3	3.07	4.29	39.7
Romania	1926.3	1694.6	-12.0	3902.9	4852.2	24.3	2.03	2.86	40.9
Slovenia*	220.0	130.7	-40.6	580.8	700.0	20.5	2.64	5.36	103.0
Russia*	20192.2	11218.3	-44.4	47015.0	33085.3	-29.6	2.32	2.95	27.2
FSU	42925.0	27356.5	-36.3	101422.6	67395.1	-33.6	2.36	2.46	4.2
Eastern Europe	13056.3	7810.4	-40.2	36766.2	28505.9	-22.5	2.82	3.65	29.4

Notes: * 1984-88= 1992; ** 1984-88 = 1993
Source: Own calculations based on FAOSTAT data

Table 2. Structure of the Bulgarian dairy processing industry according the export orientation of the processors in 2003-2004

Type of license	2003			2004		
	# Processors	Share of all processors (%)	Share in processed milk (%)	# Processors	Share of all processors (%)	Share in processed milk (%)
Export to EU	16	4.6	15.3	28	8.2	35.7
Export to other countries	46	13.1	42.1	41	12.0	26.8
Only domestic sales	288	82.3	42.6	272	79.8	37.5
Total	350	100.0	100.0	341	100.0	100.0

Source: Ministry of Agriculture and Forestry (2004), Bulgaria

Table 3. FDI and Retailing in Eastern Europe

Country	EBRD Reform Index*	Dairy indicators		Processing		Retailing	
		Average dairy farm size (# cows)	Dominant milk producers	FDI (% of the processed volume)	Main FDI inflow	FDI (% of the retailing)	Main FDI inflow
Poland	3.5	11.0	family farm	15-30	1994-1995	10	1995-1996
Slovakia	3.3	340.0	corporate	62	since 2000	10	since 2000
Bulgaria	3.3	1.6	family farm	5	since 1999	6	1999-2001
Russia	2.9	2-15[b]	mixed	< 10	since 1998	<5	since 2001
Albania	2.6	2.0	family farm	5[a]	2002	0	---

Note: * EBRD Reform index: data for 2002; [a] The dairy industry in Albania processes about 20% of total milk produced in the country. [b] Half of the milk is produced by households, which size according to official sources is in the range of 2-15 cows. Corporate farms, however, operate on much larger scale (200-1000 cows);
Source: EBRD (2003) for the EBRD Reform Index, Authors' survey results for the dairy indicators and FDI; USDA (2003), Dries et al (2004) and authors' estimates for FDI shares.

Table 4. Structure of the Slovakian dairy processing sector, 2003

Company Name	Location	Majority owner	FDI since	Market share*
Mliekospol, a.s.	Nové Zamky	95% Sole, Italy	2002	8%
Tamilk, a.s.	Trnava	100% Sole, Italy	2001	4%
Sole Slovakia, a.s.	Bratislava	99% Sole, Italy	2001	4%
Rajo, a.s.	Bratislava	51% Meggle, Germany	1993	13%
Liptovska Mliekaren, a.s.	Liptovsky Mikulas	97% Bongrain, France	2000	6%
Zvolenska Mliekaren, a.s.	Zvolen	100% Bongrain, France	2001	4%
Milex Nové Mesto nad Vahom, a.s.	Nové mesto nad Vahom	51% Co-operative (49% Bongrain, France)	2001	4%
Zempmilk, a.s.	Michalovce	91% Fromageries Bel, France	2000	7%
Prievidzska Mliekaren, a.s.	Prievidza	95% Artax, Austria	2000	4%
Milsy, a.s.	Banovce nad Bebravou	95% Artax, Austria	2001	4%
Nutricia Dairy, s.r.o.	Nitra	100% Friesland, Netherlands	2000	4%
Laktis, a.s.	Zilina	(9% Friesland, Netherlands)	2002	5%
Milex Galanta, a.s.	Galanta	100% Amine Aour Middle Foods, Lebanon	2002	3%
Danone, s.r.o.	Modranka Trnava	100% Danone, France	2000	1%
Senicka Mliekaren, a.s.	Senica	67% Co-operative		4%
Levicka Mliekaren, a.s.	Levice	Domestic		4%
Milkagro, s.r.o.	Presov	Domestic		4%
AGW Milk, a.s.	Trebisov	Domestic		3%
Humenska Mliekaren, a.s.	Humenné	Domestic		4%
Gemerska Mliekaren, s.r.o.	Rimavska Sobota	Domestic		1%
Tatranska Mliekaren, a.s.	Kezmarok	Domestic		2%
Tvrdosinska Mliekarin, s.r.o.	Tvrdosin	???		4%
Other				3%

* Estimate

Note: a.s. = corporation; s.r.o. = Limited Liability Company

Source: Authors' survey results

Table 5. Bulgaria: Distribution channels of the interviewed dairy processors in 2003

Company Name	Distribution channels							Contracts with supermarkets	HACCP certified
	BG supermarkets	FDI supermarkets	Wholesalers	Own shops	Other	Export			
						EU	Other		
Large-scale (> 60 mio ltr.)									
Serdika 90	Y (2000)	N	Y	Y	N	N	Y	Y	Y (2003)
Markelli	Y	Y	Y	N	N	Y	Y	Y	N
Danone	Y	Y	Y	N	N	N	N	Y	N
Middle-scale (15-60 mio ltr.)									
Meggle	Y (2001)	Y (2001)	Y (2001)	N	N	Y	Y	Y	Y (2002)
Mlekimex	Y	Y	Y	N	Y	N	Y	Y	Y (2002)
Fama	Y (1995)	Y (1997)	Y	N	N	N	Y	Y	In process
Iotovi	Y (1995)	N	Y (1999)	N	N	N	Y	Y	Y (2001)
Merone	Y	N	Y	N	N	N	Y	Y	
Small-scale (< 15 mio ltr.)									
PRL	Y (2002)	Y (2003)	Y	N	N	N	N	Y	In process
Mandra Obnova	Y (2001)	Y (2003)	Y (1998)	Y (1998)	N	N	N	Y	In process
Milky World	Y	N	Y	N	N	N	N	N	N

Source: Authors' survey results

Table 6. Farm assistance programs offered by dairy companies

Company Name	Credit-specific	Credit - general	Input supply*	Extensión service	Veterinary Service	Ban loan guarantee
Poland**						
Mlekpol	Y		Y	Y	N	Y
Mleczarnia	N		Y	N	N	Y
Kurpie	Y		Y	Y	N	Y
Mazowsze	Y		Y	Y	N	N
ICC Paslek	Y		Y	Y	N	Y
Warmia Dairy	Y		Y	Y	Y	Y
Bulgaria						
Merone	Y(2000)	N	Y(n.a.)	Y(1992)	N	N
Fama	Y(1994)	N	Y(1994)	N	N	Y(once)
Mlekimex	Y(1997)	Y(1998)	Y(1997)	Y(1999)	Y(1997	Y(1998)
Danone	Y(1997)	N	Y(1998)	Y(2000)	Y(1995)	Y(1999)
Iotovi	N	N	Y(1995)	N	N	Y(1995)
Milky World	Y(1999)	Y(2000)	Y(1999)	Y(1999)	N	Y(1999)
Markelli	Y(1999)	N	Y(1998)	N	N	N
Mandra Obnova	Y(1998)	N	Y(2000)	Y(2000)	N	N
Meggle	Y(2001)	N	Y(2001)	Y(2001)	N	N
PRL	N	N	N	Y(2002)	N	N
Serdika 90	Y(1997)	N	Y(1997)	Y(1997)	N	N
Slovakia						
Liptovska	Y(2000)	N	N	Y(1994)	N	N
Mliekospol	Y(1999)	N	N	Y(1992)	Y(1992)	Y(1992)
Rajo	Y(2001)	N	Y/N	Y(1992)	N	N
Levicka	Y(1998)	N	Y(1998)	Y(0000)	N	Y(1998)
Tatranska	Y(2001)	N	Y(2000)	Y(0000)	N	N
Nutricia Dairy	Y(2000)	N	N	N	N	Y(2000)
Romania						
Danone	Y		Y	Y		Y
Friesland	Y		Y	Y		Y
Promilch	Y		Y	Y		Y
Raraul	N		Y	Y		N

*Either the company provides inputs and the farmer pays back later, or the company offers forward credit, which the farmer uses to buy inputs.
** In Poland no distinction is made between credit for dairy-specific investments and general investments. Farm-level evidence shows that the dairy companies mainly support dairy-specific investments
Source: Dries and Swinnen (2004) and Van Berkum (2004)

Table 7. Share of interviewed dairy companies having assistance programs, in %

		Credit	Inputs	Extension	Veterinary	Bank	Total
	PL	50	67	50	0	50	43
1994	SK	0	0	83	17	17	23
	BG	9	18	9	0	0	7
	PL	83	100	83	17	83	73
1998	SK	17	17	83	17	33	33
	BG	45	64	18	18	18	33
	PL	83	100	83	17	83	73
2002	SK	100	33	83	17	50	57
	BG	82	91	73	18	36	60

Source: Authors' survey results

Table 8. Structure and duration of the payment delays in the Bulgarian dairy sector, 1994-2003

Year	Farms with Payment Delay (% of all delivering farms)	Average length of the Payment Delay* (days)
1994	33.6	75
1995	35.9	79
1996	34.9	81
1997	38.2	75
1998	37.1	69
1999	33.8	65
2000	27.6	71
2001	22.4	61
2002	15.9	48
2003	10.5	27

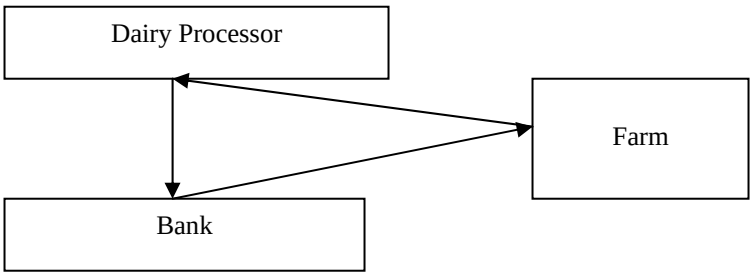
Note: * Farms that have never been paid for delivered milk are excluded from the estimation.
Source: Noev *et al.* (2005)

Table 9. Contracts partners and arrangements for collection and transport in Romanian dairy

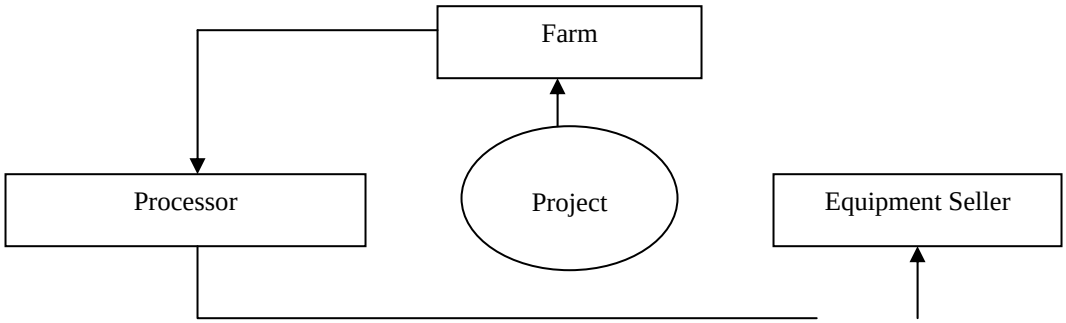
Arrangement	Danone	Friesland	Promilch/ISPA	Raraul
Contracting small farmers	X	X	X	X
Contracting large farmers	X	X		X
Owning collection centres		X	X	X
Arranging transport farm- collection centre			X	X
Arranging transport collection centre-dairy			X	X

Note: X means 'yes' or 'applicable to'
Source: Van Berkum (2004)

Box 1: Triangular structure
(E.g. Polish dairy processors provides loan guarantees for bank loans to farms)



Box 2: Leasing of dairy equipment by joint leasing project
(Wimm Bill Dann (WBD) – De Laval)



Box 3: Dairy Processors as Financial Institutions
(Loans and Collateral in Contracting with Danone in Romania)